GIS mapping technique to avoid bycatch

AUTHOR(S):

Shiba, Naoya

CITATION:

Shiba, Naoya. GIS mapping technique to avoid bycatch. Proceedings of The First SEASTAR2000 Workshop 2000: 47-49

ISSUE DATE:

2000

URL:

http://hdl.handle.net/2433/44197

GIS MAPPING TECHNIQUES TO AVOID BYCATCH

Naoya Shiba
Graduate School of Informatics, Kyoto University
Kyoto 606-8501, Japan
Phone: +81-75-723-3137(TEL)
FAX: +81-75-723-3137(FAX)
shiba@bre.soc.i.kyoto-u.ac.jp

Abstract A tracking system on the Internet of green sea turtles was developed. The system can display turtle migration paths automatically on the Internet. To analyze the green turtle behavior and to avoid bycatch, I conducted GIS technique. GIS is Geographic Information System. On the map much information is integrated and analyzed. It is important to know the relationship between turtle migration and bycatch caused by shrimp trawling.

Keywords: Internet, PTT, GIS, bycatch, sea grass bed

Introduction

It is said that shrimp trawling causes bycatch of sea turtles. To avoid bycatch it is important to know migration paths of the sea turtles and fisheries ground. To know the migration paths ARGOS system seems to be powerful. Because ARGOS system teaches us the location of turtles attached PTTs by using satellite communication, we know the location of the turtle all over the world. ARGOS system gives such data as, the location, date time, SST, staying hours at surface when PTT sends radio waves to satellite NOAA. I used ARGOS system and its data to know green sea turtles migration paths and avoid bycatch. To avoid bycatch I will use GIS technique. To integrate and overlay the migration paths and fisheries information on the map, I will try to research the relationship between the migration paths and bycatch.

1. Tracking System on the Internet

We developed a new system that can renew and display the satellite tracking of green sea turtles automatically on Internet. (Figure.1, 2 and 3) This system can display current location of 7 turtles with the ID umber. Six of the turtles, 16724, 28532, 28533, 28534, 16723 and 26796 were in the Gulf of Thailand. (Table 1) The 18683 is in the Andaman Sea. This system can tracked many turtles at the same time. The location is automatically renewed. The system can display the migration paths as break lines and the surface time, surface temperature, the date and time when the PTTs uplink a satellite.

You can make a access this system easily by the Internet and the URL is the following.

http://bg66.soc.i.kyoto-u.ac.jp/shiba/seastar2000/index.htm

2. GIS Mapping Technique to Avoid Bycatch

Geographic Information System is a tool to analyze and integrate much information on map. We applied the GIS to avoid bycatch caused by shrimp trawling. To examine the relationship between the migration paths of the green sea turtles and sea surface temperature, the SST and the depth of the Gulf of the Thailand, both seem not to affect the

migration of the green sea turtles since SST of surface in the Gulf of Thailand keeps around 29 degrees centigrade through the year. The depth is shallow everywhere (even the deepest point has less than 100 meters). Therefore the temperature and the depth seem not to have much influence on the migration of green sea turtle.

The sea grass bed seems to have much influence on the migration because in one tracked turtle (ID number 18683) in the Andaman Sea swam straight to one sea grass bed after another and stayed for a long time sea grass bed area. The sea grass bed seems to be so important to understand the migration of the green sea turtle. The growth of the sea grass bed depends on the depth and bottom environment. The depth affects photosynthesis because too deep area has less light for sea grass to grow. In addition the bottom environment affects the growth of sea grass.

On the other hand, the trawling area is important to avoid bycatch because shrimp trawling causes bycatch. The shrimp trawling area is changed seasonally and is different according to the shrimp species. This trawling area is necessary to know relationship between the shrimp trawling and the migration paths of the green turtles and to avoid bycatch.

Therefore I need more information about the sea grass bed and fisheries information such as trawling areas, CPUE, the trawling seasons in the Gulf of Thailand in examining and analyzing.

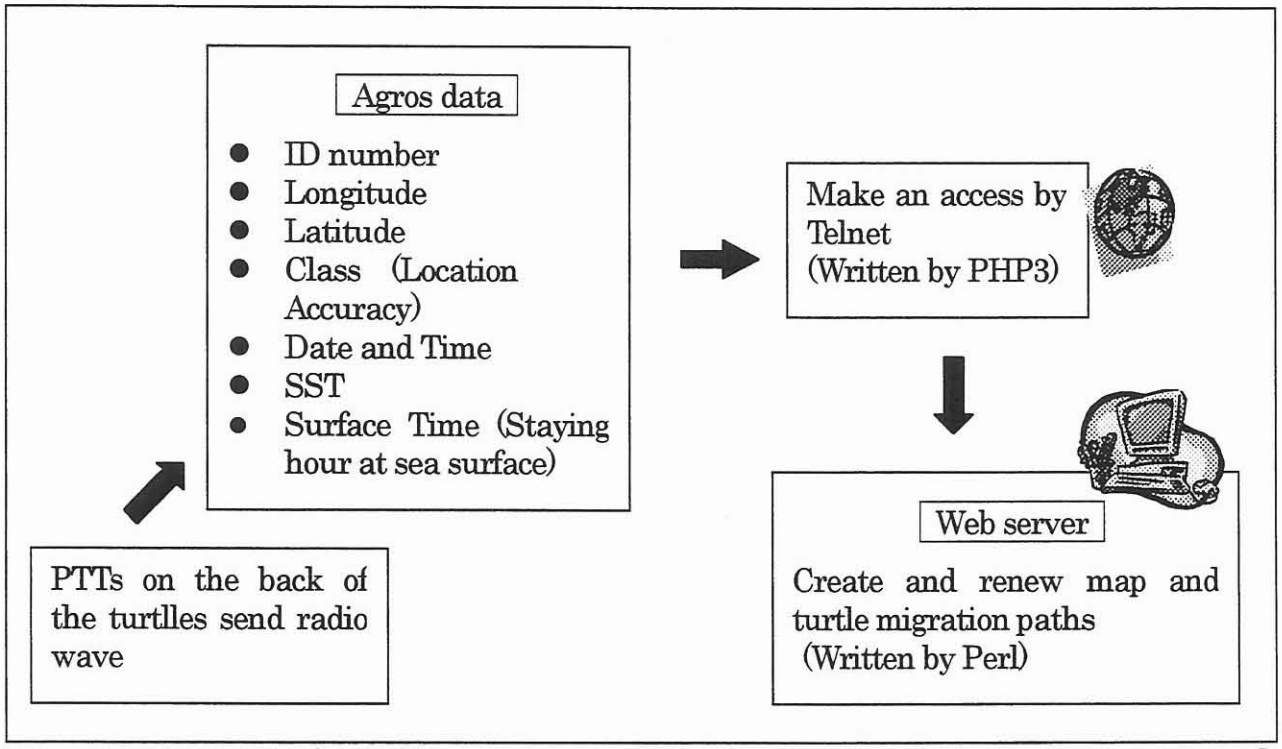

Figure1. The flow of data on the tracking system. First the PTT on the turtle back sends radio wave to satellite NOAA. The radio wave includes Argos data such as ID number, location information including longitude, latitude and classes (location araucarias), date and time when radio wave sends, the SST and the surface time. The web server that has the tracking system gets Argos data by Telnet and creates and renews map and turtle location.

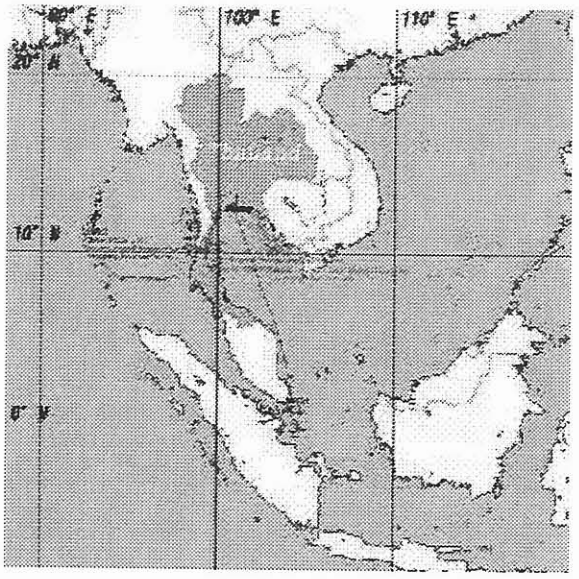

Figure 2. Interface of the system. 7 turtles are tracked on the system. Each migration path of turtle is displayed as different colors according to each ID number. On the digital map the location of turtle is drown as the points. The migration paths are created as break line that links each point showing the location. This map is clickable map and users can enlarge anywhere they like.

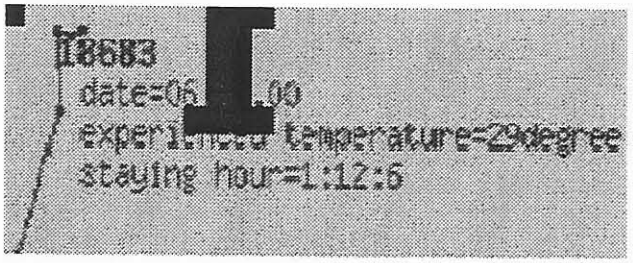

Figure3. Enlarged map. Of the tracking turtles 2 turtles, ID number 18683 and 26769 display such data as date and experienced SST, surface time. Surface time means a turtle staying hour at the sea surface.

Turtle Name	ID number	PTT types	Released Point	CCL (cm)	Weight (kg)
Sampreang	16724	ST-18	Mannnai Island	91x104	125
Sri Koa Khram	28532	ST-18	Khram Island	85x98	115
Sri Sattahip	28533	ST-18	Khram Island	86x94	90
Sri Chonburi	28534	ST-18	Khram Island	89x100	130
Chao Samut	16723	ST-18	Khram Island	86x98	110
Sri Racha	29679	KiwiSAT	Mannnai Island	76x84	59
Kayano	18583	KiwiSAT	Similan Islands	90x110	–

Table 1. Tracked turtles data. Turtle names, ID number, released point, CCL and weight. ST-18 is manufactured by Telonics Co. Ltd. KiwiSAT is manufactured by SirTrocle.